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COLORIMETRIC AND ELECTROCHEMICAL DETECTION OF PATHOGEN IN WATER USING SILVER IONS AS A UNIQUE PROBE

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The manuscript highlights the efficacy of silver ions to act as a unique probe for the detection of bacterial contamination in water samples. The bacterial cell membrane adherence property of the silver ions was employed to develop two different bacterial detection assays employing colorimetric and electrochemical techniques. In one of the schemes, silver ion was used directly as a detector of bacteria in a colorimetric assay format, and in the other scheme surface-functionalized antibodies were used as a primary capture for specific detection of *Salmonella enterica serovar typhi*. The colorimetric detection is based on silver-induced inhibition of urease activity and silver ion utilization by bacteria for the rapid screening of enteric pathogens in water. The specific detection of bacteria uses an antibody-based electrochemical method that employs silver as an electrochemical probe. The ability of silver to act as an electrochemical probe was investigated by employing Anodic Stripping Voltammetry (ASV) for targeted detection of *Salmonella typhi*. For further insights into the developed assays, inductively coupled plasma mass spectrometry (ICP-MS) and transmission electron microscopy (TEM) studies were performed. The sensitivity of the developed assay was found to be 100 cfu mL⁻¹ for colorimetric and 10 cfu mL⁻¹ for electrochemical assay respectively.